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CRBR-82-36

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 Charles E. MacDonald, FCTC
 Ralph G. Page, FCUF
 Robert J. Dube, SG (2)
 Robert E. Browning, WM (2)

FROM: Homer Lowenberg, Chief Engineer
 Office of Nuclear Material Safety and Safeguards

SUBJECT: CRBR FUEL CYCLE ENVIRONMENTAL REVIEW -
 ORIGEN2 OUTPUTS - REVISION 1 (4/15/82)

The enclosed materials were received from ORNL, and should update material on ORIGEN2 transmitted 4/9/82 by CRBR-82-33 from this office. They are:

1. Revised table of contents
2. Revisions of tables 2, 3, 4, 5, 6.

Please destroy the previous versions of these items.

The originals of volumes 2 and 3 were hand-delivered to Tom Clark, and those of volumes 4 and 5 to Regis Boyle. Should information from these volumes be necessary for your calculations please contact them.

A microfiche of the entire revised printout is also available in my office.

If there are any questions about this material, please contact either me or Phil Colton.

Original signed by:

Homer Lowenberg, Chief Engineer
 Office of Nuclear Material Safety
 and Safeguards

Enclosures:

1. Revised table of contents
2. Revised CRBR fuel characteristics tables 2, 3, 4, 5, 6

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OFFICE	CRBR/NMSS	CRBR/NMSS				
SURNAME	JFColton:sds	HLowenberg				
DATE	4/15/82	4/15/82				

4/15/82

Table 2. Details of CRBR average irradiation characteristics

Material type	Parameter					
	Average ^a charge rate kg/cycle	Average inventory kg heavy metal	Average power MW(t)	Average specific power MW(t)/MTIHM	Residence time full-power days	Average discharge burnup MWD/MTIHM
Core						
Fuel ^b	2645.0	5290.0	748.9	141.6	550	77,880
AB ^c	2152.9	4305.8	17.1	3.97	550	2,184
Fuel + AB	4797.9	9595.8	766.0	79.83	550	43,907
Inner blanket						
"Fuel" ^d	2240.8	4481.5	113.1	25.24	550	13,882
AB	1742.8	3485.6	13.3	3.82	550	2,101
"Fuel" + AB	3983.6	7967.1	126.4	15.87	550	8,729
Radial blankets						
Radial blanket 1						
"Fuel"	850.9	3403.6	46.6	13.7	1100	15,070
AB	661.8	2647.3	5.1	1.93	1100	2,123
"Fuel" + AB	1512.7	6050.9	51.7	8.54	1100	9,394
Radial blanket 2						
"Fuel"	748.8	3744.0	27.7	7.40	1375	10,175
AB	582.4	2912.0	3.1	1.06	1375	1,458
"Fuel" + AB	1331.2	6656.0	30.8	4.63	1375	6,366
Radial blanket 1 + 2						
"Fuel"	1599.7	7147.6	74.3	10.4	1229	12,779
AB	1244.2	5559.3	8.2	1.48	1229	1,819
"Fuel" + AB	2843.9	12,706.9	82.5	6.49	1229	7,977
Total	11,625.4	30,269.8	975	32.21		23,063

^aAveraged over cycles 5-10.^b36 in. (Pu,U)O₂ region.^cComposite of upper (14 in.) and lower (14 in.) UO₂ axial blankets.^d36 in. UO₂ region at the same axial elevation as the core fuel.

Table 3. Details of the CRBR fuel cycle management for cycles 5-10

		Fuel management schedule, kg heavy metal (fuel assemblies)												
Cycle ^a	Parameter	Core			Inner blanket			Radial blanket 1			Radial blanket 2			
		Fuel ^b	AB ^c	Fuel + AB	"Fuel" ^d	AB	"Fuel" + AB	"Fuel"	AB	"Fuel" + AB	"Fuel"	AB	"Fuel" + AB	
EOC4	Inventory	0	0	0 (0)	0	0	0 (0)	0	0	0 (0)	3744.0	2912.0	6656.0 (66)	
BOC5	+ Charge	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	3403.6	2647.3	6050.9 (60)	0	0	0 (0)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC5	- Discharge	0	0	0 (0)	340.4	264.7	605.1 (6)	0	0	0 (0)	3744.0	2912.0	6656.0 (66)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	0	0	0 (0)	
BOC6	+ Charge	199.6	162.5	362.1 (6)	0	0	0 (0)	0	0	0 (0)	3744.0	2912.0	6656.0 (66)	
	= Inventory	5389.8	4387.1	9766.9 (162)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC6	- Discharge	5389.8	4387.1	9766.9 (162)	4311.3	3353.3	7664.6 (76)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	0	0	0 (0)	0	0	0 (0)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
BOC7	+ Charge	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC7	- Discharge	0	0	0 (0)	340.4	264.7	605.1 (6)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
BOC8	+ Charge	199.6	162.5	362.1 (6)	0	0	0 (0)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	5389.8	4387.1	9776.9 (162)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC8	- Discharge	5389.8	4387.1	9776.9 (162)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	0	0	0 (0)	
	= Inventory	0	0	0 (0)	0	0	0 (0)	0	0	0 (0)	3744.0	2912.0	6656.0 (66)	
BOC9	+ Charge	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	3403.6	2647.3	6050.9 (60)	0	0	0 (0)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4651.7	3618.0	8269.7 (82)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC9	- Discharge	0	0	0 (0)	340.4	264.7	605.1 (6)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	5190.2	4224.6	9414.8 (156)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
BOC10	+ Charge	199.6	162.5	362.1 (6)	0	0	0 (0)	0	0	0 (0)	0	0	0 (0)	
	= Inventory	5389.8	4387.1	9776.9 (162)	4311.3	3353.3	7664.6 (76)	3403.6	2647.3	6050.9 (60)	3744.0	2912.0	6656.0 (66)	
EOC10	- Discharge	5389.8	4387.1	9776.9 (162)	4311.3	3353.3	7664.6 (76)	0	0	0 (0)	3744.0	2912.0	6656.0 (66)	
	= Inventory	0	0	0 (0)	0	0	0 (0)	3403.6	2647.3	6050.9 (60)	0	0	0 (0)	

^aEOCx = end of cycle x; BOCy = beginning of cycle y.

^b36 in. (Pu,U)O₂ region.

^cComposite of upper (14 in.) and lower (14 in.) UO₂ axial blankets.

^d36 in. UO₂ region at the same axial elevation as the core fuel.

Table 4. Initial compositions of 1000 kg of CRBR heavy metal

Nuclide	Material type	
	Fuel ^a	Blankets
U-235, g	1,340	2,000
U-238, g	668,660	998,000
Total uranium, g	670,000	1,000,000
Pu-236, g	0.005	
Pu-238, g	198	
Pu-239, g	283,932	
Pu-240, g	38,610	
Pu-241, g	6,600	
Pu-242, g	660	
Total plutonium, g	330,000	
Total heavy metal, g	1,000,000	1,000,000

^aAssumes no preirradiation decay.

Table 5. Summary characteristics for the CRBR

Parameter	Fuel region(s) ^a					
	Fuel	AB	Fuel + AB	IB	RB ^b	Fuel + AB + IB + RB
Electric power, MW(e) net						
Thermal power, MW(t)	749.0	17.1	766.1	126.4	82.5	975.0
Average specific power, ^c MW(t)/MTIHM	141.6	3.97	79.8	15.9	6.49	32.21
Average fuel burnup, MWd/MTIHM	77,880	2184	43,907	8729	7977	23,063
Irradiation duration, full-power days	550	550	550	550	1229 ^d	
Refueling cycle length, full-power days	275	275	275	275	275	275
Average charge, kg/refueling cycle ^d						
²³⁵ U	3.5	4.3	7.8	8.0	5.7	21.5
Total uranium	1772.1	2152.9	3925.0	3983.6	2843.9	10,752
Fissile plutonium ^e	768.5	0	768.5	0	0	768.5
Total plutonium	872.9	0	872.9	0	0	872.9
Total (U + Pu)	2645.0	2152.9	4797.9	3983.6	2843.9	11,625
Average discharge, kg/refueling cycle ^d						
²³⁵ U	2.5	3.6	6.1	5.6	4.0	15.7
Total uranium	1682.0	2109.2	3791.2	3807.0	2726.9	10,325
Fissile plutonium ^e	612.8	37.6	650.4	131.3	89.1	870.8
Total plutonium	750.1	38.7	788.8	138.3	94.9	1022.0
Total (U + Pu)	2432.1	2147.9	4580.0	3945.3	2821.8	11,347

^aFuel = 36 in. (Pu,U)O₂ region, AB = UO₂ axial blankets associated with fuel, IB = entire inner blanket, RB = entire radial blanket.

^bWeighted average of inner radial blanket (4 cycle residence) and outer radial blanket (5 cycle residence).

^cBased on rated power level.

^dAveraged over 4 cycles.

^e²³⁹Pu + ²⁴¹Pu + ²³⁹Np.

Table 6. Physical characteristics of CRBR fuel assemblies

	Core and axial blanket	Inner and radial blankets
Assembly component lengths, cm		
Upper end hardware	30.4	29.2
Gas plenum	124.5	124.5
Upper axial blanket	35.6	
Core or radial blanket	91.4	162.6
Lower axial blanket	35.6	
Lower end hardware	109.2	109.2
Overall total	426.7	426.7
Fuel element total	290.6	290.6
Assembly shape	hexagonal	hexagonal
Assembly flats, cm	11.62	11.62
Fuel element arrangement	triangular	triangular
Fuel elements per assembly	217	61
Fuel element OD, cm	0.584	1.285
Fuel pellet OD, cm		
Core	0.491	
Axial blanket	0.483	
Inner and radial blanket		1.194
Fuel pellet density, % of theoretical		
Core	91.3	
Axial blanket	96.0	
Inner and radial blanket		95.6
Fuel element pitch, cm	0.731	1.378
Cladding thickness, cm	0.038	0.038
Channel thickness, cm	0.305	0.305
Channel height, cm	314	314
Circumscribed volume/assembly, m ³	0.0607	0.0607
Heavy metal/assembly, kg	60.35	100.85
MO ₂ assembly, kg ^b	68.45	114.39
Stainless steel/assembly, kg	135.5	122.6
Assembly total weight, kg	204	237

^aBased on data in ref. 10.

^b(Pu,U)O₂ in the core and UO₂ in the axial, inner, and radial blankets.

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1 OUTPUT TABLES--TITLE-SUMMARY OF FUEL AND STRUCT MAT'L CIRC AND DISCHG REACTIVITY AND BURNUP DATA *Core Fuel, Core AB; Inner Blkt Fuel* RECYCLE # = 0

1 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

2 CONCENTRATIONS, GRAMS NUCLEIDE TABLE:

16 CONCENTRATIONS, GRAMS ELEMENT TABLE:

18 CONCENTRATIONS, GRAMS SUMMARY TABLE:

ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****

20 CONCENTRATIONS, GRAMS NUCLEIDE TABLE:

23 CONCENTRATIONS, GRAMS ELEMENT TABLE:

24 CONCENTRATIONS, GRAMS SUMMARY TABLE:

FISSION PRODUCTS****FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****

26 CONCENTRATIONS, GRAMS NUCLEIDE TABLE:

43 CONCENTRATIONS, GRAMS ELEMENT TABLE:

44 CONCENTRATIONS, GRAMS SUMMARY TABLE:

47 (ALPHA,N) NEUTRON SOURCE

48 SPONTANEOUS FISSION NEUTRON SOURCE

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49 OUTPUT TABLES--TITLE-SUMMARY OF FUEL AND STRUCT MAT'L CIRC AND DISCHG REACTIVITY AND BURNUP DATA *Inner Blkt AB; Radial Blkt Fuel, Radial Blkt AB* RECYCLE # = 0

49 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

50 ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****

53 CONCENTRATIONS, GRAMS NUCLEIDE TABLE:

54 CONCENTRATIONS, GRAMS ELEMENT TABLE:

54 CONCENTRATIONS, GRAMS SUMMARY TABLE:

FISSION PRODUCTS****FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****

56 CONCENTRATIONS, GRAMS NUCLEIDE TABLE:

73 CONCENTRATIONS, GRAMS ELEMENT TABLE:

74 CONCENTRATIONS, GRAMS SUMMARY TABLE:

77 (ALPHA,N) NEUTRON SOURCE

78 SPONTANEOUS FISSION NEUTRON SOURCE

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79 OUTPUT TABLES--TITLE-DECAY OF CORE *Assemblies* REACTIVITY AND BURNUP DATA *604-18yfs*, RECYCLE # = 0

79 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

80 CONCENTRATIONS, GRAMS SUMMARY TABLE:

82 RADIOACTIVITY, CURIES SUMMARY TABLE:

84 THERMAL POWER, WATTS SUMMARY TABLE:

86 RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG SUMMARY TABLE:

88 RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG SUMMARY TABLE:

ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****ACTINIDES + DAUGHTERS****

90 CONCENTRATIONS, GRAMS SUMMARY TABLE:

92 RADIOACTIVITY, CURIES SUMMARY TABLE:

94 THERMAL POWER, WATTS SUMMARY TABLE:

96 RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG SUMMARY TABLE:

98 RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG SUMMARY TABLE:

100 ALPHA RADIOACTIVITY CURIES SUMMARY TABLE:

FISSION PRODUCTS****FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****

102 CONCENTRATIONS, GRAMS SUMMARY TABLE:

104 RADIOACTIVITY, CURIES SUMMARY TABLE:

106 THERMAL POWER, WATTS SUMMARY TABLE:

108 RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG SUMMARY TABLE:

110 RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG SUMMARY TABLE:

111 (ALPHA,N) NEUTRON SOURCE

112 SPONTANEOUS FISSION NEUTRON SOURCE

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Assemblies

60D-10yrs.

RECYCLE # = 0

115 OUTPUT TABLES--TITLE--DECAY OF RADIAL BLANKET AND STRUCTURAL MATERIALS

115 REACTIVITY AND BURDEN DATA

116 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

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112 RADIOACTIVE INHALATION HAZARD, MPPS AIR AT RCG SUMMARY TABLE:

114 RADIOACTIVE INGESTION HAZARD, MPPS WATER AT RCG SUMMARY TABLE:

114 *ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**

116 CONCENTRATIONS, GRAMS SUMMARY TABLE:

117 RADIOACTIVITY, CURIES SUMMARY TABLE:

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114 RADIOACTIVE INGESTION HAZARD, MPPS WATER AT RCG SUMMARY TABLE:

116 ALPHA RADIOACTIVITY CURIES SUMMARY TABLE:

116 *FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****

116 CONCENTRATIONS, GRAMS SUMMARY TABLE:

116 RADIOACTIVITY, CURIES SUMMARY TABLE:

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116 ALPHA RADIOACTIVITY CURIES SUMMARY TABLE:

116 *FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****

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151 OUTPUT TABLES--TITLE--DECAY OF CORE FUEL AND STRUCTURAL MATERIAL

151 REACTIVITY AND BURDEN DATA

151 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

152 CONCENTRATIONS, GRAMS SUMMARY TABLE:

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158 *ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**

162 CONCENTRATIONS, GRAMS SUMMARY TABLE:

164 RADIOACTIVITY, CURIES SUMMARY TABLE:

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172 ALPHA RADIOACTIVITY CURIES SUMMARY TABLE:

172 *FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****

174 CONCENTRATIONS, GRAMS SUMMARY TABLE:

177 RADIOACTIVITY, CURIES SUMMARY TABLE:

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181 RADIOACTIVE INHALATION HAZARD, MPPS AIR AT RCG SUMMARY TABLE:

185 RADIOACTIVE INGESTION HAZARD, MPPS WATER AT RCG SUMMARY TABLE:

185 ALPHA RADIOACTIVITY CURIES SUMMARY TABLE:

186 *FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****FISSION PRODUCTS****

Assemblies

60D-10yrs.

RECYCLE # = 0

187 OUTPUT TABLES--TITLE--DECAY OF INNER BLANKET AND STRUCTURAL MATERIALS

187 REACTIVITY AND BURDEN DATA

188 ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****ACTIVATION PRODUCTS****

188 CONCENTRATIONS, GRAMS SUMMARY TABLE:

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223	OUTPUT TABLES--FUEL REPROCESSING OUTPUT AND VOLATILES DECAY	RECYCLE # = 0
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224	CONCENTRATIONS, GRAMS	SUMMARY TABLE:
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230	RADIOACTIVE INGESTION HAZARD, MPP3 WATER AT RCC	SUMMARY TABLE:
	*ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**	
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354	CONCENTRATIONS, GRAMS	SUMMARY TABLE:
356	RADIOACTIVITY, CURIES	SUMMARY TABLE:
358	THERMAL POWER, WATTS	SUMMARY TABLE:
360	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:
362	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:
364	ALPHA RADIOACTIVITY CURIES	SUMMARY TABLE:
	EMISSION PRODUCTS*****EMISSION PRODUCTS*****EMISSION PRODUCTS*****EMISSION PRODUCTS*****	
366	CONCENTRATIONS, GRAMS	SUMMARY TABLE:
368	RADIOACTIVITY, CURIES	SUMMARY TABLE:
370	THERMAL POWER, WATTS	SUMMARY TABLE:
372	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:
374	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:
376	(ALPHA) NEUTRON SOURCE	
378	SPONTANEOUS EMISSION NEUTRON SOURCE	

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377	OUTPUT TABLES--THERMAL DECAY OF STRUCTURAL MATERIAL WASTES	10 days - 2 yrs.	RECYCLE # = 0
379	REACTIVITY AND BURNUP DATA		
	ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****		
380	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
382	RADIOACTIVITY, CURIES	SUMMARY TABLE:	
384	THERMAL POWER, WATTS	SUMMARY TABLE:	
386	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:	
388	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:	
	ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**		
390	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
392	RADIOACTIVITY, CURIES	SUMMARY TABLE:	
394	THERMAL POWER, WATTS	SUMMARY TABLE:	
396	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:	
398	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:	
400	ALPHA RADIOACTIVITY CURIES	SUMMARY TABLE:	
	EMISSION PRODUCTS*****EMISSION PRODUCTS*****EMISSION PRODUCTS*****EMISSION PRODUCTS*****		
402	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
404	RADIOACTIVITY, CURIES	SUMMARY TABLE:	
406	THERMAL POWER, WATTS	SUMMARY TABLE:	
408	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:	
410	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:	
412	(ALPHA) NEUTRON SOURCE		
414	SPONTANEOUS EMISSION NEUTRON SOURCE		

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417	OUTPUT TABLES--THERMAL DECAY OF STRUCTURAL MATERIAL WASTES	3 yrs. - 10 ⁶ yrs	RECYCLE # = 0
419	REACTIVITY AND BURNUP DATA		
	ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****		
420	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
422	RADIOACTIVITY, CURIES	SUMMARY TABLE:	
424	THERMAL POWER, WATTS	SUMMARY TABLE:	
426	RADIOACTIVE INHALATION HAZARD, M**3 AIR AT RCG	SUMMARY TABLE:	
428	RADIOACTIVE INGESTION HAZARD, M**3 WATER AT RCG	SUMMARY TABLE:	
	ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**ACTINIDES + DAUGHTERS**		
430	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	

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423	RADIACTIVITY, CURIES	SUMMARY TABLE:
420	THERMAL POWER, WATTS	SUMMARY TABLE:
432	RADIOACTIVE INHALATION HAZARD, MPP3 AIR AT RCG	SUMMARY TABLE:
434	RADIOACTIVE INGESTION HAZARD, MPP3 WATER AT RCG	SUMMARY TABLE:
436	ALPHA RADIACTIVITY CURIES	SUMMARY TABLE:
	*FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****	
450	CONCENTRATIONS, GRAMS	SUMMARY TABLE:
441	RADIACTIVITY, CURIES	SUMMARY TABLE:
443	THERMAL POWER, WATTS	SUMMARY TABLE:
445	RADIOACTIVE INHALATION HAZARD, MPP3 AIR AT RCG	SUMMARY TABLE:
447	RADIOACTIVE INGESTION HAZARD, MPP3 WATER AT RCG	SUMMARY TABLE:
449	(ALPHA-N) NEUTRON SOURCE	
450	SPONTANEOUS FISSION NEUTRON SOURCE	

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451	OUTPUT TABLES--TITLE DECAY OF RECOVERED URANIUM	90 days - 100 yrs,	RECYCLE # = 0
451	REACTIVITY AND BURNUP DATA		
	*ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS****		
	*ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS**		
452	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
454	RADIACTIVITY, CURIES	SUMMARY TABLE:	
456	THERMAL POWER, WATTS	SUMMARY TABLE:	
459	RADIOACTIVE INHALATION HAZARD, MPP3 AIR AT RCG	SUMMARY TABLE:	
460	RADIOACTIVE INGESTION HAZARD, MPP3 WATER AT RCG	SUMMARY TABLE:	
464	ALPHA RADIACTIVITY CURIES	SUMMARY TABLE:	
	*FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****		
464	(ALPHA-N) NEUTRON SOURCE		
465	SPONTANEOUS FISSION NEUTRON SOURCE		

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466	OUTPUT TABLES--TITLE DECAY OF RECOVERED PLUTONIUM	90 days - 100 yrs,	RECYCLE # = 0
466	REACTIVITY AND BURNUP DATA		
	*ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS*****ACTIVATION PRODUCTS****		
	*ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS***ACTINIDES + DAUGHTERS**		
467	CONCENTRATIONS, GRAMS	SUMMARY TABLE:	
469	RADIACTIVITY, CURIES	SUMMARY TABLE:	
471	THERMAL POWER, WATTS	SUMMARY TABLE:	
473	RADIOACTIVE INHALATION HAZARD, MPP3 AIR AT RCG	SUMMARY TABLE:	
475	RADIOACTIVE INGESTION HAZARD, MPP3 WATER AT RCG	SUMMARY TABLE:	
477	ALPHA RADIACTIVITY CURIES	SUMMARY TABLE:	
	*FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****FISSION PRODUCTS*****		
479	(ALPHA-N) NEUTRON SOURCE		
480	SPONTANEOUS FISSION NEUTRON SOURCE		

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